# SCHOOL AND SOCIETY

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accumulated a reserve fund which now contains over $12,000,000 to be spent, principal and interest, leaving the original endowment intact after all expectations have been satisfied.

During the year 1926–27, the average age at which teachers in receipt of allowances from the Carnegie Foundation chose to retire was 68.28. Four retiring professors were 65 years old, nine were 66, five were 70, one was 75, and one was 86. For the five years preceding, the average age of retirement was 66.8 years. Thus the professors who retired during 1926–27 remained in service on the average about sixteen months longer.

From 1922 to 1927, fifty professors retiring at Columbia, Harvard, Johns Hopkins, Princeton, and Yale served until an average age of 67.6. Those at Yale retired earliest, at 66.1 years; those at Johns Hopkins latest, at 68.4 years.

Teachers of science appear to retire younger than the average by about nineteen months. Four anatomists served their institutions until they were 68.2 years of age, while 19 chemists retired at 66.6.

All told, a total of 979 teachers have retired on allowances from the foundation, and 469 widows have received pensions. Allowances and pensions in force at the end of the year numbered 809.

The Teachers Insurance and Annuity Association of America, which was organized by the Carnegie Foundation and financed by the Carnegie Corporation, completed its eighth year on December 31, 1926. The deferred annuity contracts of the association have now been adopted by 120 universities and colleges, 22 research institutions, and 34 endowed schools, a total of 176 institutions. Teachers in 400 other institutions have taken contracts in the association without the assistance of the institutions with which they are connected.

The number of annuity contracts in force increased during the year from 3,640 to 4,543, or 25 per cent. The association is now one of the largest annuity companies in the country. The number of life insurance contracts in force increased during the year from 3,251 to 3,715, or 14 per cent. The life insurance contracts are held by 2,456 individuals. The total number of annuity and insurance contracts increased during the year by 20 per cent., from 6,891, held by 5,229 different policyholders, to 8,257, held by 6,318 different persons. The association has resources of more than nine million dollars.

As in each year heretofore, the trustees of the association were able to set aside for deferred annuity contracts, interest at the rate of one half of one per cent., in addition to the contractual rate of 4 per cent., the highest allowed by law, and also to pay on all insurance policies dividends of one per cent. on the reserve, over the contractual rate of 3½ per cent., the highest allowed by law, together with a conservative part of the saving from favorable mortality.

## EDUCATIONAL RESEARCH AND STATISTICS

### A COMPARATIVE STUDY OF THE INTELLIGENCE OF INDIANS IN UNITED STATES INDIAN SCHOOLS AND IN THE PUBLIC OR COMMON SCHOOLS

#### Introduction

It would be a matter of scientific and practical interest to know if the Indian children attending the United States Indian schools are more or less superior to those Indian children in the public, or common schools of the United States. And, if they are found to be one way or the other, or just equal to them, it would be of importance to know the causes contributing to the existing conditions.

With a view to answering the above-indicated questions, the writers have brought together in array results of the performance of Indians in the national intelligence tests in both types of schools and handled them in various ways, so that we believe that, within the limits of this study, we are able to offer some facts heretofore unknown to the scientific world and to those having practical interests in view.[1]

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[1] The writers were assisted in this study by many graduate students, particularly the following: Owen D. Smith, T. J. Serafini, Dewey Dutton, Wendell Abell, Finis Johnson and Nathan Schuelke.

Acknowledgment is made of the assistance of the Survey of Indian Affairs for a grant of $404 for clerical assistance, and to the Grants Committee of the American Association for the Advancement of

The very vital question to be answered here is: to what extent does the governmental boarding school supply to the Indian child an environment equal to that supplied by the environment usually provided to the child in the public school, which is granting that the intelligence test, when applied to Indians, measures social opportunity as well as just intelligence, which it alone measures in the case of the white child in his ordinary white social context.

### THE PROBLEM

Our problem here is to determine if the Indian student in the United States Indian School, as measured by Scale A, Form 1, of the National Intelligence Test. differs from the Indian student in the public schools, when all varying factors, besides those to be measured, have been held constant or at least allowed for in the interpretation.

### THE SUBJECTS OF THE EXPERIMENT AND THE TESTS

The tests are among the most thoroughly standardized of the intelligence tests and were administered by the writer and graduate students thoroughly trained in the administration of them. The groups studied were of the following composition:

U. S. Indian Schools:
  Full bloods, 1,022; mixed bloods, 631; total, 1,654.
Public Schools:
  Full bloods, 291; mixed bloods, 311; total, 602.
Total Indians:
  Full bloods, 1,313; mixed bloods, 942; total, 2,256.
  (The white children were used for controls.)
  White children—public schools, 387.

The tribes represented were such as Choctaw, Seminole, Creek, Cherokee, Sioux, Pueblo, Navajo, Cheyenne, Kickapoo; in fact, most of the tribes were pretty fairly well represented, but the study does not include any effort at arriving at significance of results due to tribe.

The distribution with reference to U. S. Indian Schools is as follows:

| | Full Bloods | Mixed Bloods |
|---|---|---|
| Rapid City | 67 | 146 |
| Chilocco | 339 | 267 |
| Santa Fe | 231 | 35 |
| Albuquerque | 129 | 3 |
| Shiprock | 41 | 0 |
| Pine Ridge | 148 | 54 |
| Pierre | 67 | 128 |
| Total | 1,022 | 633 |

All the public schools were in the eastern part of the state of Oklahoma and were widely scattered over an area of 35,000 square miles, being in small towns usually or in rural communities. The largest schools in which tests were made were in Poteau and Spiro, in LeFlore County, and in Ada, in Pontotoc County. Other counties in which rural schools were tested are Pottawatomie, Seminole, Sequoyah, Bryan, Carter, Hughes, Creek and Cherokee.

With reference to sex there were:

U. S. Indian Schools:
  Full blood boys, 531; mixed blood boys, 309.
  Full blood girls, 491; mixed blood girls, 322.
Public Schools:
  Full blood boys, 170; mixed blood boys, 147.
  Full blood girls, 121; mixed blood girls, 164.
Whites:
  Boys, 182; girls, 205.

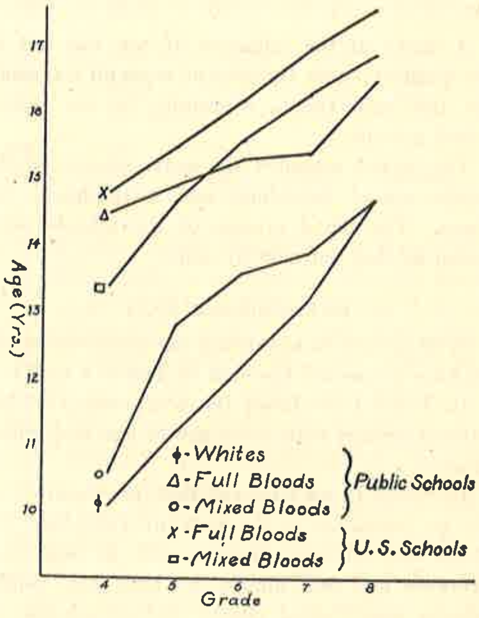

FIG. 1

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Science for a grant defraying expenses on one of the expeditions to the Indians, part of the data of which expedition is used in this study.

TABLE I

SHOWING AGES OF SUBJECTS IN DIFFERENT GROUPS

United States Indian Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Number | 242 | 227 | 216 | 201 | 136 | 1022 |
| Average years | 14.8 | 15.5 | 16.2 | 17.0 | 17.6 | 16.1 |
| S.D. " | 2.1 | 2.2 | 2.0 | 1.8 | 1.6 | 2.2 |
| Mixed Bloods— | | | | | | |
| Number | 121 | 130 | 161 | 134 | 85 | 631 |
| Average years | 13.4 | 14.7 | 15.6 | 16.3 | 16.9 | 16.7 |
| S.D. " | 2.5 | 2.2 | 1.6 | 1.7 | 1.7 | 2.4 |

Public Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Number | 66 | 67 | 71 | 51 | 36 | 291 |
| Average years | 14.5 | 14.9 | 15.3 | 15.4 | 16.5 | 15.2 |
| S.D. " | 2.4 | 2.2 | 1.6 | 1.6 | 1.8 | 2.0 |
| Mixed Bloods— | | | | | | |
| Number | 74 | 62 | 59 | 63 | 53 | 311 |
| Average years | 10.6 | 12.8 | 13.6 | 13.9 | 14.7 | 13.0 |
| S.D. " | 1.7 | 1.8 | 1.1 | 1.6 | 1.1 | 2.1 |
| Whites— | | | | | | |
| Number | 79 | 85 | 75 | 73 | 75 | 387 |
| Average years | 10.1 | 11.2 | 12.2 | 13.2 | 14.7 | 12.1 |
| S.D. " | 1.5 | 1.3 | 1.7 | 1.5 | 1.5 | 2.2 |

A study of the influence of sex was out of the question, since the groups were all too small for this subdivision, especially in the public school groups.

The whites attended the same schools as the public school full-blood and mixed-blood Indians. The blood groups of the schools were tested as they sat side by side.

### HANDLING THE DATA

With a view to answering the questions raised we have presented the data in Tables I to VI.

In Table I is shown the composition of the various groups with reference to age and school grade.

In Table II we have the first presentation of the performance in the tests of full-blood Indians and whites. Here it will be seen that averages of full bloods in both the public schools and United States Indian schools, as well as of whites, increase according as the school grade increases, though the increase in the case of the full-blood Indians in the U. S. Indian schools, and of the white students in public schools, is much greater than it is for the full bloods in the public schools.

While the age of the full-blood Indians of the U. S. Indian schools is greater than that of the full-blood Indians of the public schools, still the difference is very slight and could hardly account for the difference as found. Reference to Table VI will show that, when age has been partialed out, the influence of grade on score in the case of full bloods is greater than it is for the full bloods in the public school. Here, for the former, partial coefficient of correlation is + .65, P.E. + .01, and for the latter it is + .47, P.E. + .04. A further reference to the table will show that age is a factor that may be almost ignored, for the partial correlations are always small when education is controlled. These will be seen to be for

TABLE II

Showing Scores for Subjects in Different Groups

NIT—Scale A, Form 1

United States Indian Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Average Score | 52.7 | 65.8 | 79.5 | 95.8 | 105.7 | 76.7 |
| S.D. “ | 19.7 | 20.9 | 22.6 | 20.9 | 20.2 | 28.1 |
| Median “ | 51.5 | 65.3 | 81.5 | 95.9 | 106.1 | 76.1 |
| Q “ | 14.3 | 14.4 | 17.2 | 13.7 | 14.2 | 20.9 |
| Mixed Bloods— | | | | | | |
| Average Score | 65.7 | 75.2 | 95.7 | 112.7 | 123.6 | 93.4 |
| S.D. “ | 10.5 | 7.5 | 10.9 | 9.5 | 7.5 | 6.7 |
| Median “ | 61.2 | 73.2 | 94.2 | 112.1 | 121.2 | 91.8 |
| Q “ | 18.4 | 18.5 | 18.9 | 17.7 | 9.0 | 23.2 |

Public Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Average Score | 61.1 | 67.9 | 80.1 | 91.5 | 94.5 | 76.8 |
| S.D. “ | 22.9 | 22.9 | 20.8 | 21.2 | 21.9 | 24.5 |
| Median “ | 56.7 | 63.8 | 82.9 | 95.0 | 95.0 | 78.9 |
| Q “ | 15.9 | 17.9 | 17.3 | 14.1 | 18.3 | 20.7 |
| Mixed Bloods— | | | | | | |
| Average Score | 66.6 | 84.7 | 97.9 | 104.6 | 114.3 | 94.2 |
| S.D. “ | 8.5 | 10.1 | 11.0 | 8.5 | 10.5 | 13.0 |
| Median “ | ........ | ........ | ........ | ........ | ........ | ........ |
| Q “ | ........ | ........ | ........ | ........ | ........ | ........ |
| Whites— | | | | | | |
| Average Score | 73.2 | 85.7 | 91.6 | 105.4 | 123.0 | 97.9 |
| S.D. “ | 22.8 | 23.1 | 20.0 | 23.6 | 21.4 | 29.2 |
| Median “ | 70.9 | 86.9 | 97.8 | 113.9 | 124.5 | 97.4 |
| Q “ | 16.9 | 12.9 | 13.2 | 21.3 | 13.9 | 17.6 |
| Per Cent. of Overlapping— | | | | | | |
| Full-Blood Public Schools on Full-Blood U. S. Indian Schools Median | %<br>59.3 | %<br>48.2 | %<br>52.4 | %<br>48.3 | %<br>28.7 | %<br>52.1 |
| Mixed-Blood Public Schools on Mixed-Blood U. S. Indian Schools Median | %<br>66.2 | %<br>75.0 | %<br>59.6 | %<br>34.6 | %<br>40.6 | %<br>50.5 |

full bloods in the U. S. Indian schools and in the public schools, respectively, –.07 and –.18. In fact, education has a stronger effect, as measured in this same fashion, on the whites than it does on the full bloods in the public schools, as indicated by the partial coefficient of correlation where age is held constant, viz., +.58, P.E. as against the +.47 of the full bloods of the same type of school.

It is more difficult to speak with confidence with reference to the mixed bloods, because the degree of blood was a factor very hard to handle, but an examination of Table II and of Table VI will indicate that, while mixed bloods in both educational situations are about on a par, school grade is a decidedly stronger factor in the case of the mixed blood in the U. S. Indian School than it is for any other educational group studied. Here it is +.73, P.E.+.011. But this should not be taken excepting in connection with the additional fact that these mixed bloods are much older for their grades than are those in the common schools. (See Table V, showing retardation.)

The point here noted is that the increase in score by grade is greater than it is for full bloods in the public schools in the case of full bloods in U. S. Indian schools. But this must

TABLE III

SHOWING NIT–IQ'S FOR SUBJECTS IN DIFFERENT GROUPS

United States Indian Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Median IQ | 59.4 | 65.6 | 70.3 | 74.4 | 77.7 | 69.6 |
| Q " | ? | 9.6 | 6.2 | 6.8 | 6.4 | 8.3 |
| Mixed Bloods— | | | | | | |
| Median IQ | 73.8 | 73.0 | 79.5 | 81.1 | 83.8 | 78.9 |
| Q " | ? | 11.5 | 9.2 | 8.6 | 7.3 | 15.2 |

Public Schools

| Grade | 4th | 5th | 6th | 7th | 8th | Total |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| Median IQ | 70.0 | 68.3 | 73.2 | 77.5 | 75.0 | 72.5 |
| Q " | 11.4 | 10.9 | 10.1 | 8.9 | 7.8 | 10.8 |
| Mixed Bloods— | | | | | | |
| Median IQ | 95.7 | 84.2 | 90.5 | 89.6 | 87.5 | 90.5 |
| Q " | 11.1 | 11.2 | 11.0 | 8.9 | 9.6 | 9.0 |
| Whites— | | | | | | |
| Median IQ | 104.7 | 102.8 | 97.5 | 100.8 | 95.7 | 100.1 |
| Q " | 10.1 | 11.0 | 15.1 | 18.6 | 11.0 | 13.1 |
| Per Cent. of Overlapping— | | | | | | |
| Full-Blood Public Schools on Full-Blood U. S. Indian Schools Median | % 65.0 | % 58.0 | % 62.1 | % 63.9 | % 42.6 | % 59.2 |
| Mixed-Blood Public Schools on Mixed-Blood U. S. Indian Schools Median | % 87.8 | % 87.1 | % 74.5 | % 73.0 | % 67.8 | % 73.9 |

be taken in connection with the facts of overlapping as given in the same Table II. There these measures are seen to be not very significant, except in the case of the overlapping in the eighth grades, where the full bloods in the U. S. Indian schools are seen to be very superior to the common school students. The overlapping is here seen to be 28.7 per cent., which is a rather significant measure of difference.

The important point is that the effect of school grade is greater as indicated by the coefficients of partial correlation in the case of the full bloods and mixed bloods in the U. S. Indian schools than it is in the common schools. It seems to be as important a factor as it is in the case of the whites.

Another method of handling the data is found in expressing the individual NIT scores as mental ages, and then finding the IQ for each individual. In this way it seems legitimate to speak of the IQ's as independent of age. We find here again that there is more change in the median IQ for the full bloods in going from the 4th grade median IQ to the 8th grade median IQ. (See Table III.) In the case of

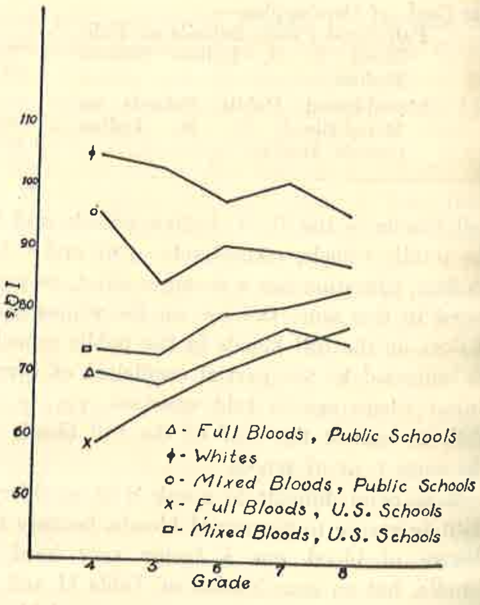

FIG. 2

### TABLE IV

### Showing Distribution of Degree of Indian Blood for the Mixed Bloods of Both Educational Groups

| Degree of Indian Blood | | Less than one fourth | One fourth to 31/64 | One half to 47/64 | Three fourths to 63/64 | Total |
|---|---|---|---|---|---|---|
| U. S. Indian Schools | No. | 11 | 130 | 330 | 160 | 631 |
| Public Schools | No. | 220 | 49 | 28 | 14 | 311 |

the full bloods of the U. S. Indian schools it starts with 59.38 and gradually increases to 77.65 with a median IQ for the 1,022 cases of 69.55. The full bloods of the common schools begin in the 4th grade with a median IQ of 70, and fluctuate somewhat through all the grades, as will be seen from Table III. There is no steady rise, but the median IQ for the group of 291 is 72.50. As would be expected, the median IQ for the whites is around 100, being here 100.07. The measures of overlapping of the common school distribution is somewhat better than that of the U. S. Indian schools, excepting in the case of the 8th grade distribution. All in all, the average overlapping on the U. S. Indian School median is not significant, and we can say again that the handling of the data from the IQ method reveals no striking difference. The significant fact again is, that the change in IQ for the students in the U. S. Indian School is greater than it is for the students of full blood in the common schools, as they become more educated.

The next step is to measure by the method of correlation the effect of education on the IQ for both groups, so as to see in which group the latter is the more effective. For the U. S. Indian schools it is found to be for full bloods +.26, mixed bloods +.14; for the common schools, for the full bloods +.10 and mixed bloods −.15.

While the educational retardation of these students is not a question altogether of intelligence, still it seemed worth while to look into this phase of the situation.

Table V gives us the facts of educational retardation for the different groups. On the whole the most retarded group is seen to be the full bloods of the U. S. Indian schools, as determined by the average for the five grade measures. In the U. S. Indian schools it is seen to be for full bloods 95.1 per cent. and for mixed bloods 88.7 per cent. In the case of the common schools, for the full bloods the percentage of retardation decreases in going from the 4th to the 8th grade, but the average for the five grades is rather high, 90.7 per cent. In the case of the mixed bloods it is not so high, being 48.9 per cent. as against 32.3 per cent. for the whites. If we allow for the retardation of the white, which is on the average 32.3 per cent., the Indian retardation would not seem quite so

### TABLE V

### Showing Educational Retardation of Full Bloods, Mixed Bloods, and Whites

| Grade | 4th | 5th | 6th | 7th | 8th | Average |
|---|---|---|---|---|---|---|
| U. S. Indian Schools—Full Bloods | 95.5 | 92.5 | 95.8 | 96.5 | 95.5 | 95.1 |
| Public Schools—Full Bloods | 97.0 | 94.0 | 93.0 | 84.3 | 77.8 | 90.7 |
| U. S. Indian Schools—Mixed Bloods | 81.8 | 90.0 | 91.9 | 88.1 | 91.7 | 88.7 |
| Public Schools—Mixed Bloods | 32.5 | 66.1 | 57.6 | 42.9 | 49.1 | 48.9 |
| Whites | 25.3 | 40.0 | 32.0 | 28.8 | 34.7 | 32.3 |

significant. However, it is always greater for the Indian groups than it is for the whites.

An interesting phase of the situation is found in the degree of Indian blood of the mixed bloods, as shown in Table IV. From the distribution it will be seen that in the U. S. Indian schools the median degree is found to be around one half to an approximation of three fourths of a degree of Indian blood, while in the common school group, whose distribution is so skewed that we have not undertaken to use the method of correlation on it, the median is found to be somewhere less than one fourth degree of Indian blood.

TABLE VI

SHOWING PARTIAL COEFFICIENTS OF CORRELATION

| 1 score<br>2 grade<br>3 age | $r_{12.3}$ | P.E. | $r_{13.2}$ | P.E. | $r_{23.1}$ | P.E. |
|---|---|---|---|---|---|---|
| Full Bloods— | | | | | | |
| U. S. Indian Schools | .65 | .01 | −.07 | .02 | .36 | .019 |
| Public Schools | .47 | .04 | −.18 | .03 | .25 | .04 |
| Mixed Bloods— | | | | | | |
| U. S. Indian Schools | .73 | .015 | −.29 | .029 | .53 | .022 |
| Public Schools | .52 | .029 | .01 | .03 | .52 | .029 |
| Whites | .58 | .025 | −.22 | .037 | .71 | .019 |

## SUMMARY

1. On the whole the Indians in the United States Indian schools are older than any of the other children. But the Indians in the public schools are older than the whites, the full bloods being older than the mixed bloods.

2. The average score of the full bloods in the United States Indian schools begins lower and rises higher and more steadily than that of the full bloods in the public schools. This same condition is true in the case of the mixed bloods of the United States schools, when compared with the mixed bloods of the public schools. These facts and the measures of overlapping bear us out in the statement that the score of both the blood groups increases more with education than does that of the blood groups in the public schools. But, taken in the large, regardless of school grade, the two groups are about the same. There is a question if this should be done, for we are studying the effect of education on the score.

3. The IQ's, grade for grade, appear to show the mixed bloods of both the U. S. Indian schools and public schools to be more intelligent than the full bloods of the corresponding school groups. Also, they seem to show that the U. S. school groups, full bloods and mixed bloods, are not quite so intelligent as the respective blood groups of the public schools. But, on the average, since the overlapping of the full blood IQ for the total groups is only 59.2 per cent., it would appear that they have about equal intelligence. The average IQ's are 69.6 for full bloods of the U. S. Indian schools and 72.5 for full bloods of the public schools. However, in the case of the mixed bloods, the public school students are much more intelligent, as thus determined. But, when we take into consideration the high degree of white blood, we are not surprised. But, strange to say, the comparative superiority of the mixed bloods in the public schools over those of the U. S. Indian schools tends to diminish with school grade.

4. The question as to whether or not the U. S. Indian School students compare favorably with those of the public schools in intelligence is now pertinent. From the above observations we would say, and, if the reader will examine the graphs this will be the more apparent, the U. S. Indian School either has more profound effect on the measured intelligence of the full-blood and mixed-blood students in their care than do the public schools (there is found to be more improvement), or from the time the students go from the lower grades to the higher there has been operative a stronger factor of selection. From the facts as given here we can not say, but we are inclined to think that both factors operate.

5. So that, if we may venture an opinion, we would say that the U. S. Indian schools are doing more toward helping those Indian students who come to them than the public schools. However, we judge that many come whom they can not help.

THOMAS R. GARTH
JAMES E. GARRETT